***ESTRUCTURAS DINÁMICAS (operaciones con matrices)***

Son estructuras flexibles porque en una lista de elementos u objetos de cualquier tipo originalmente vacía, que durante la ejecución del programa vaya creciendo y decreciendo elemento a elemento según las necesidades previstas en el programa. Pueden clasificarse en listas lineales y no lineales.

**Ejercicio 01.** Encontrar la transformada que permita volcar los elementos de la matriz A de n\*n.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** | **4** |
| **0** | 0 | 1 | 3 | 6 | 10 |
| **1** | 2 | 4 | 7 | 11 |  |
| **2** | 5 | **8** | 12 |  |  |
| **3** | 9 | 13 |  |  |  |
| **4** | 14 |  |  |  |  |

## /\* 01 TRANSFORMADA EN UNA MATRIZ TRANGULAR SUPERIOR IZQUIERDA, sentido

***diagonal derecha descendente ---- CODIGO EN Dev-C++\*/***

#include <stdio.h> main()

{

int matriz[20][20], dim,i,j,db,item; printf("\nINGRESAR DIMENSION DE LA MATRIZ : ");

scanf("%d",&dim);

printf("\nIngresar Direccionamiento Base: "); scanf("%d",&db);

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

item=**db+(i+j)\*(i+j+1)/2 + i**; matriz[i][j]=item;

}

}

printf("\nLECTURA DE ASIGNACION DE MATRIZ\n");

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if(j<dim-i)

printf("\t%d",matriz[i][j]);

else

printf("\t ");

}

printf("\n");

}

printf("\nQue posición desea saber de matriz[i][j]\n"); printf("\nIngresar i: ");scanf("%d",&i);

printf("\nIngresar j: ");scanf("%d",&j); printf("\nEl valor es: %d",matriz[i][j]);

}

# Ejercicio 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** | **4** |
| **0** | 0 | 2 | 5 | 9 | 14 |
| **1** | 1 | 4 | 8 | 13 |  |
| **2** | 3 | 7 | 12 |  |  |
| **3** | 6 | 11 |  |  |  |
| **4** | 10 |  |  |  |  |

**t (i, j) = db+(i+j)\*(i+j+1)/2 + j**;

## /\* 02 TRANSFORMADA EN UNA MATRIZ TRANGULAR SUPERIOR IZQUIERDA, sentido

***diagonal derecha ascendente\*/***

#include <stdio.h> main()

{

int matriz[20][20], dim,i,j,db,item; printf("\nINGRESAR DIMENSION DE LA MATRIZ : ");

scanf("%d",&dim);

printf("\nIngresar Direccionamiento Base: "); scanf("%d",&db);

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

item=db+(i+j)\*(i+j+1)/2 + j; matriz[i][j]=item;

}

}

printf("\nLECTURA DE ASIGNACION DE MATRIZ\n");

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if(j<dim-i)

printf("\t%d",matriz[i][j]);

else

printf("\t ");

}

printf("\n");

}

printf("\nQue posicion desea saber de matriz[i][j]\n"); printf("\nIngresar i: ");scanf("%d",&i);

printf("\nIngresar j: ");scanf("%d",&j);

printf("\nEl valor es: %d",matriz[i][j]);

}

# Ejercicio 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** | **4** |
| **0** | 0 | 1 | 5 | 6 | 14 |
| **1** | 2 | 4 | 7 | 13 |  |
| **2** | 3 | 8 | 12 |  |  |
| **3** | 9 | 11 |  |  |  |
| **4** | 10 |  |  |  |  |

**t(i, j) = db+ (i+j)\*(i+j+1)/2 +**

**j Si i+j es par**

**i Si i+j es impar**

## /\* 03 TRANSFORMADA EN UNA MATRIZ TRANGULAR SUPERIOR IZQUIERDA sentido

***zigzag superior\*/***

#include <stdio.h> main()

{

int matriz[20][20], dim,i,j,db,item; printf("\nINGRESAR DIMENSION DE LA MATRIZ : ");

scanf("%d",&dim);

printf("\nIngresar Direccionamiento Base: "); scanf("%d",&db);

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if((i+j)%2==0)

{

item=db+(i+j)\*(i+j+1)/2 + j; matriz[i][j]=item;

}

else

{

item=db+(i+j)\*(i+j+1)/2 + i; matriz[i][j]=item;

}

}

}

printf("\nLECTURA DE ASIGNACION DE MATRIZ\n");

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if(j<dim-i)

printf("\t%d",matriz[i][j]);

else

printf("\t ");

}

printf("\n");

}

printf("\nQue posicion desea saber de matriz[i][j]\n"); printf("\nIngresar i: ");scanf("%d",&i);

printf("\nIngresar j: ");scanf("%d",&j);

printf("\nEl valor es: %d",matriz[i][j]);

}

## Ejercicio 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** | **4** |
| **0** | 0 | 2 | 3 | 9 | 10 |
| **1** | 1 | 4 | 8 | 11 |  |
| **2** | 5 | 7 | 12 |  |  |
| **3** | 6 | 13 |  |  |  |
| **4** | 14 |  |  |  |  |

**t(i, j) = db+ (i+j)\*(i+j+1)/2 +**

**i Si i+j es par**

**j Si i+j es impar**

***/\* 04 TRANSFORMADA EN UNA TRANGULAR SUPERIOR IZQUIERDA sentido zigzag***

***inferior\*/***

#include <stdio.h> #include <stdlib.h> main()

{

int matriz[20][20], dim,i,j,db,item; printf("\nINGRESAR DIMENSION DE LA MATRIZ : ");

scanf("%d",&dim);

printf("\nIngresar Direccionamiento Base: "); scanf("%d",&db);

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if((i+j)%2==0)

{

item=db+(i+j)\*(i+j+1)/2 + i; matriz[i][j]=item;

}

else

{

item=db+(i+j)\*(i+j+1)/2 + j; matriz[i][j]=item;

}

}

}

printf("\nLECTURA DE ASIGNACION DE MATRIZ\n");

for(i=0;i<dim;i++)

{

for(j=0;j<dim;j++)

{

if(j<dim-i)

printf("\t%d",matriz[i][j]);

else

printf("\t ");

}

printf("\n");

}

printf("\nQue posicion desea saber de matriz[i][j]\n"); printf("\nIngresar i: ");scanf("%d",&i);

printf("\nIngresar j: ");scanf("%d",&j);

printf("\nEl valor es: %d",matriz[i][j]);

}

# DESARROLLAR LAS TRANSFORMADAS DE LAS SIGUIENTES MATRICES:

(NOTA: el inicio de la serie sucesiva es 0)

**/\* 5 MATRIZ DE LA FORMA /\* 9 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | 0 |
|  | | | 2 | 1 |
|  | | 5 | 4 | 3 |
|  | 9 | 8 | 7 | 6 |
| 14 | 13 | 12 | 11 | 10 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | 0 |
|  | | | 1 | 2 |
|  | | 3 | 4 | 5 |
|  | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 |

**/\* 6 MATRIZ DE LA FORMA /\* 10 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 |  | | | |
| 1 | 2 |  | | |
| 3 | 4 | 5 |  | |
| 6 | 7 | 8 | 9 |  |
| 10 | 11 | 12 | 13 | 14 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 |  | | | |
| 2 | 1 |  | | |
| 5 | 4 | 3 |  | |
| 9 | 8 | 7 | 6 |  |
| 14 | 13 | 12 | 11 | 10 |

**/\* 7 MATRIZ DE LA FORMA /\* 11 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |  |
| 9 | 10 | 11 |  | |
| 12 | 13 |  | | |
| 14 |  | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 3 | 2 | 1 | 0 |
| 8 | 7 | 6 | 5 |  |
| 11 | 10 | 9 |  | |
| 13 | 12 |  | | |
| 14 |  | | | |

**/\* 8 MATRIZ DE LA FORMA /\* 12 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 |
|  | 5 | 6 | 7 | 8 |
|  | | 9 | 10 | 11 |
|  | | | 12 | 13 |
|  | | | | 14 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 3 | 2 | 1 | 0 |
|  | 8 | 7 | 6 | 5 |
|  | | 11 | 10 | 9 |
|  | | | 13 | 12 |
|  | | | | 14 |

**/\* 13 MATRIZ DE LA FORMA /\* 17 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 5 | 9 | 12 | 14 |
| 1 | 6 | 10 | 13 |  |
| 2 | 7 | 11 |  | |
| 3 | 8 |  | | |
| 4 |  | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 14 | 12 | 9 | 5 | 0 |
|  | 13 | 10 | 6 | 1 |
|  | | 11 | 7 | 2 |
|  | | | 8 | 3 |
|  | | | | 4 |

**/\* 14 MATRIZ DE LA FORMA /\* 18 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 3 | 6 | 10 |
|  | 2 | 4 | 7 | 11 |
|  | | 5 | 8 | 12 |
|  | | | 9 | 13 |
|  | | | | 14 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10 | 7 | 3 | 1 | 0 |
| 11 | 6 | 4 | 2 |  |
| 12 | 8 | 5 |  | |
| 13 | 9 |  | | |
| 14 |  | | | |

**/\* 15 MATRIZ DE LA FORMA /\* 19 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 |  | | | |
| 3 | 8 |  | | |
| 2 | 7 | 11 |  | |
| 1 | 6 | 10 | 13 |  |
| 0 | 5 | 9 | 12 | 14 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | 4 |
|  | | | 8 | 3 |
|  | | 11 | 7 | 2 |
|  | 13 | 10 | 6 | 1 |
| 14 | 12 | 9 | 5 | 0 |

**/\* 16 MATRIZ DE LA FORMA /\* 20 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | 14 |
|  | | | 9 | 13 |
|  | | 5 | 8 | 12 |
|  | 2 | 4 | 7 | 11 |
| 0 | 1 | 3 | 6 | 10 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 14 |  | | | |
| 13 | 9 |  | | |
| 12 | 8 | 5 |  | |
| 11 | 7 | 4 | 2 |  |
| 10 | 6 | 3 | 1 | 0 |

**/\* 21 MATRIZ DE LA FORMA /\* 25 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 9 | 10 | 19 | 20 |
| 1 | 8 | 11 | 18 | 21 |
| 2 | 7 | 12 | 17 | 22 |
| 3 | 6 | 13 | 16 | 23 |
| 4 | 5 | 14 | 15 | 24 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 |
| 9 | 8 | 7 | 6 | 5 |
| 10 | 11 | 12 | 13 | 14 |
| 19 | 18 | 17 | 16 | 15 |
| 20 | 21 | 22 | 23 | 24 |

**/\* 22 MATRIZ DE LA FORMA /\* 26 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 5 | 14 | 15 | 24 |
| 3 | 6 | 13 | 16 | 23 |
| 2 | 7 | 12 | 17 | 22 |
| 1 | 8 | 11 | 18 | 21 |
| 0 | 9 | 10 | 19 | 20 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 3 | 2 | 1 | 0 |
| 5 | 6 | 7 | 8 | 9 |
| 14 | 13 | 12 | 11 | 10 |
| 15 | 16 | 17 | 18 | 19 |
| 24 | 23 | 22 | 21 | 20 |

**/\* 23 MATRIZ DE LA FORMA /\* 27 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 20 | 19 | 10 | 9 | 0 |
| 21 | 18 | 11 | 8 | 1 |
| 22 | 17 | 12 | 7 | 2 |
| 23 | 16 | 13 | 6 | 3 |
| 24 | 15 | 14 | 5 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 24 | 23 | 22 | 21 | 20 |
| 15 | 16 | 17 | 18 | 19 |
| 14 | 13 | 12 | 11 | 10 |
| 5 | 6 | 7 | 8 | 9 |
| 4 | 3 | 2 | 1 | 0 |

**/\* 24 MATRIZ DE LA FORMA /\* 28 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 24 | 15 | 14 | 5 | 4 |
| 23 | 16 | 13 | 6 | 3 |
| 22 | 17 | 12 | 7 | 2 |
| 21 | 18 | 11 | 8 | 1 |
| 20 | 19 | 10 | 9 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 20 | 21 | 22 | 23 | 24 |
| 19 | 18 | 17 | 16 | 15 |
| 10 | 11 | 12 | 13 | 14 |
| 9 | 8 | 7 | 6 | 5 |
| 0 | 1 | 2 | 3 | 4 |

|  |  |
| --- | --- |
| **/\* 29 MATRIZ DE LA FORMA** | **/\* 33 MATRIZ DE LA FORMA** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 |
| 15 | 16 | 17 | 18 | 5 |
| 14 | 23 | 24 | 19 | 6 |
| 13 | 22 | 21 | 20 | 7 |
| 12 | 11 | 10 | 9 | 8 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 3 | 2 | 1 | 0 |
| 5 | 18 | 17 | 16 | 15 |
| 6 | 19 | 24 | 23 | 14 |
| 7 | 20 | 21 | 22 | 13 |
| 8 | 9 | 10 | 11 | 12 |

**/\* 30 MATRIZ DE LA FORMA /\* 34 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 12 | 13 | 14 | 15 | 0 |
| 11 | 22 | 23 | 16 | 1 |
| 10 | 21 | 24 | 17 | 2 |
| 9 | 20 | 19 | 18 | 3 |
| 8 | 7 | 6 | 5 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 15 | 14 | 13 | 12 |
| 1 | 16 | 23 | 22 | 11 |
| 2 | 17 | 24 | 21 | 10 |
| 3 | 18 | 19 | 20 | 9 |
| 4 | 5 | 6 | 7 | 8 |

**/\* 31 MATRIZ DE LA FORMA /\* 35 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 8 | 9 | 10 | 11 | 12 |
| 7 | 20 | 21 | 22 | 13 |
| 6 | 19 | 24 | 23 | 14 |
| 5 | 18 | 17 | 16 | 15 |
| 4 | 3 | 2 | 1 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 12 | 11 | 10 | 9 | 8 |
| 13 | 22 | 21 | 20 | 7 |
| 14 | 23 | 24 | 19 | 6 |
| 15 | 16 | 17 | 18 | 5 |
| 0 | 1 | 2 | 3 | 4 |

**/\* 32 MATRIZ DE LA FORMA /\* 36 MATRIZ DE LA FORMA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 5 | 6 | 7 | 8 |
| 3 | 18 | 19 | 20 | 9 |
| 2 | 17 | 24 | 21 | 10 |
| 1 | 16 | 23 | 22 | 11 |
| 0 | 15 | 14 | 13 | 12 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 |
| 9 | 20 | 19 | 18 | 3 |
| 10 | 21 | 24 | 17 | 2 |
| 11 | 22 | 23 | 16 | 1 |
| 12 | 13 | 14 | 15 | 0 |

# DESARROLLAR EL ALGORITMO Y HACER SU PROGRAMA PARA:

/\* LA CONJETURA DE CAPICUA

/\* LA CONJETURA DE COLLATZ

/\* UNA CONJETURA DE SU LIBRE ELECCION